

Microchip**Filter specification****TFS 935****1/5****Measurement condition**

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	50	Ω
Output:	50	Ω

Characteristics

Remark:

The maximum attenuation in the pass band is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 935 MHz without any tolerance or limit. The values of absolute attenuation a_{abs} are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

Data	typ. value		tolerance / limit	
Insertion loss	a_e	1.7 dB	max.	2.5 dB
Nominal frequency	f_N	-		935 MHz
Passband		-	$f_N \pm$	6 MHz
Absolute attenuation	a_{abs}			
0.3 MHz ... 874 MHz	874 MHz	43 dB	min.	40 dB
874 MHz ... 902 MHz	902 MHz	42 dB	min.	30 dB
974 MHz ... 1019 MHz	1019 MHz	55 dB	min.	40 dB
1019 MHz ... 1031 MHz	1031 MHz	54 dB	min.	50 dB
1031 MHz ... 1500 MHz	1500 MHz	44 dB	min.	40 dB
Input power level		-	max.	12 dBm
Operating temperature range	OTR	-		-30 °C ... +70 °C
Storage temperature range		-		-40 °C ... +100 °C
Temperature coefficient of frequency	TC_f *	-46 ppm/K		-

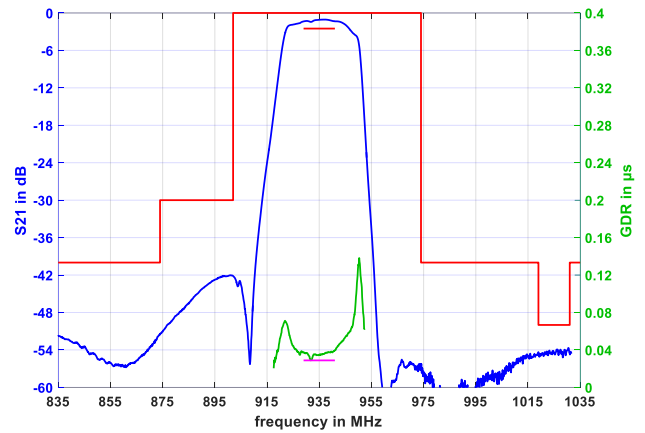
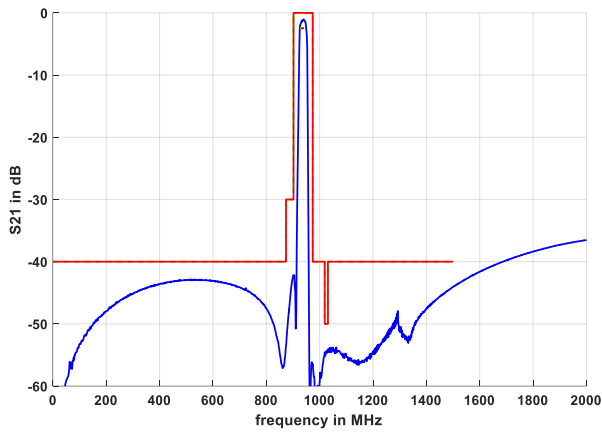
$$*) \Delta f = TC_f(T - T_A)f_N$$

Generated:**Checked / Approved:**

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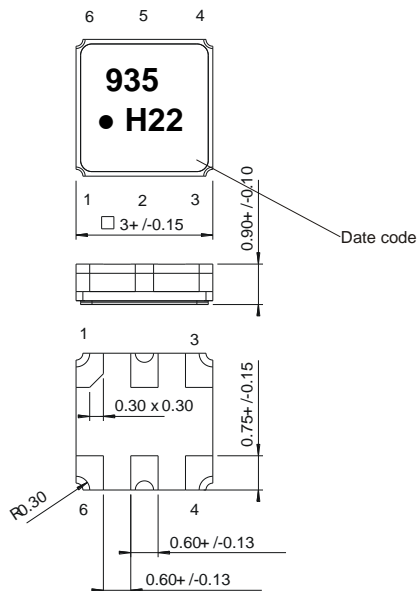
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Filter characteristic



Construction and pin connection

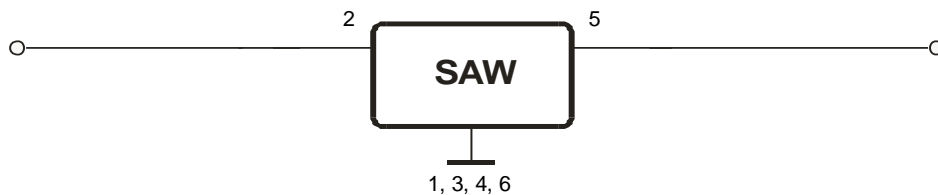
(All dimensions in mm)



- 1 Ground
- 2 Input
- 3 Ground
- 4 Ground
- 5 Output
- 6 Ground

Date code: Year + week
 H 2016
 J 2017
 K 2018
 ...

50 Ω Test circuit



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Stability characteristics, reliability

After the following tests the filter shall meet the whole specification:

1. Shock: 500 g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 60068 T2 - 27
2. Vibration: 10 Hz to 2000 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 60068 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 15 min. each / 100 cycles
DIN IEC 60068 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times max.;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

This filter is RoHS compliant (2011/65/EU)

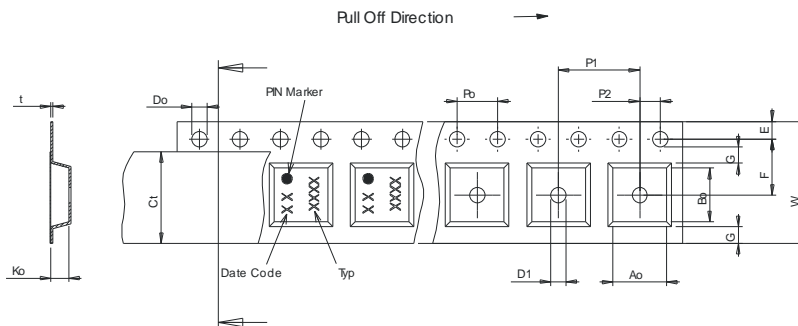
Packing

Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

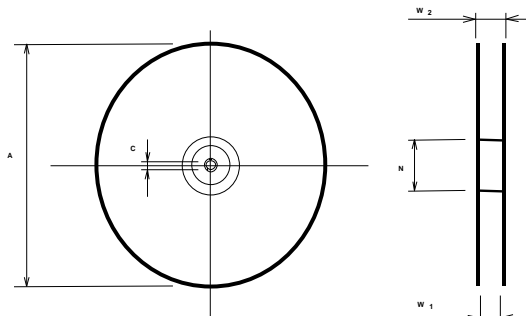
Tape (all dimensions in mm)

- W : 8.00 ± 0.3
- Po : 4.00 ± 0.1
- Do : 1.50 +0.1/-0
- E : 1.75 ± 0.1
- F : 3.50 ± 0.05
- G(min) : 0.75
- P2 : 2.00 ± 0.05
- P1 : 4.00 ± 0.1
- D1(min) : 1.50
- Ao : 3.25 ± 0.1
- Bo : 3.25 ± 0.1
- Ct : 5.3 ± 0.1



Reel (all dimensions in mm)

- A : 330 or 180
- W1 : 8.4 +1.5/-0
- W2(max) : 14.4
- N(min) : 60
- C : 13.0 ± 0.2



The minimum bending radius is 45 mm.

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Air reflow temperature conditions

Conditions	Exposure
Average ramp-up rate (30 °C to 217 °C)	less than 3 °C / second
> 100 °C	between 300 and 600 seconds
> 150 °C	between 240 and 500 seconds
> 217 °C	between 30 and 150 seconds
Peak temperature	max. 260 °C
Time within 5 °C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50 °C)	less than 6 °C / second
Time from 30 °C to Peak temperature	no greater than 300 seconds

Chip-mount air reflow profile



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Microchip**Filter specification****TFS 935****5/5**

History

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Martens	22.11.2004
1.1	- Change attenuation within 1019 – 1031	Noack	16.03.2005
1.2	- Change attenuation according to customer requirement	Noack	22.03.2005
1.3	- Generation of filter specification	Strehl	25.05.2005
1.4	- Maximum input power updated	Kortenbeutel	07.01.2014
1.5	- Update data table - Change of tape and reel direction	S.Springfeldt	25.05.2016

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